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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/566,058

03/03/2006

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112857-529

1923

29175 7590 02/11/2008
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EXAMINER

DIAO, M BAYE

ART UNIT

PAPER NUMBER

2838

MAIL DATE

DELIVERY MODE

02/11/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|-------------------------------|-------------------------------|--|
| Office Action Summary | Application No. 10/566,058 | Applicant(s) UESAKA ET AL. | |
| | Examiner M'baye Diao | Art Unit 2838 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-30 is/are rejected.
- 7) ☐ Claim(s) 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01/26/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Amendment

1. Acknowledgement is made of Amendment filed on 11/19/2007.

Oath/Declaration

2. The oath or declaration is defective because the joint inventor did not sign.
Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 16-19, 21- 26 & 28-30 are rejected under 35 U.S.C. 102(b) as anticipated by Shimoyama et al., (Shimoyama) US PAT 5,872,453.**

5. As per claims 24, 26, and 28-29, Shimoyama et al. disclose (abstract; col. 1, lines 5-67; col. 2, lines 1-28; col. 3, lines 54+; cols. 4-6; col. 7, lines 1-45) and show in Figs. 1-4:

a battery remaining capacity calculating device (19) for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery (3), said battery remaining capacity calculating device (19) comprising:

voltage measuring means (12) for measuring an output voltage value of said secondary battery (3); and

arithmetic means (23) for performing information processing, a reference voltage curve ($Y=aX + b$) as a discharge characteristic of said secondary battery (3) being recorded in said arithmetic means (23)(see Fig. 3 and col. 4, lines 1-37);

wherein said arithmetic means (23) divides a use mode of said secondary battery into a high consumption mode in which the output voltage value (V_F) is not lower than a threshold value (V_N) and a low consumption mode in which the output voltage (V_F) value is lower than the threshold value (V_N),

said arithmetic means (23) calculates a remaining capacity of said secondary battery (3) in said low consumption mode (which corresponds to maximum voltage V_F) on a basis of the voltage value (V_N) (which is a point on the voltage-current approximate linear function, col. 4, lines 34-36), measured by said voltage measuring means(12) and said reference voltage curve ($Y=aX + b$), and

said arithmetic means (23) calculates a remaining capacity in said high consumption mode (full charged voltage V_F) on a basis of a voltage gap ($V_{FH} - V_F$)(see equations (2) and (3); col. 5, lines 11+) as an output voltage change (V_{FH} or V_{EH} or V_{FL} or V_{EL}) at a time of a use mode change (from full charged to 0% remaining capacity and vice versa) and said output voltage value by adding (respectively subtracting) a first predetermined correct value (respectively a second predetermined correct value) to the full charged voltage V_F (respectively from the empty voltage V_E).

Accordingly, claims 24,26, and 28 -30 are anticipated.

As per claim 16, Shimoyama discloses (col. 4, lines 18-25) that a program configuration (thus meeting the limitation of claim 29) of a remaining capacity operation portion (19) comprises a voltage estimate means (21), a remaining capacity calculation means (23), a temperature discrimination means (27), a high temperature pattern calculation means (29) and a low temperature pattern calculation means (31).

Furthermore since the method only recites the steps of measuring output voltage, dividing a use of mode (which depends on the temperature, since the battery voltage is proportional to its temperature, col. 3, lines 26-28), and calculating the remaining capacity (via (23)) and since the device discloses the elements performing the step of dividing, measuring, calculating, the method would be inherent in view of the device.

6. Accordingly, claim 16 is anticipated.

As per claims 17 & 29, Shimoyama discloses (col. 1) that the battery remaining capacity calculating method, further comprising:

setting a reference remaining capacity (reference voltage V_N) as a remaining capacity (V_N) before the use mode change (from full charged V_F to 0% remaining capacity or vice versa) and a start voltage (V_N) as an output voltage ($V_N = V_E$, depending on high consumption mode) at a time of a start of the high consumption mode (when the battery is fully charged or $V_N = V_F$), wherein a remaining capacity is calculated on a basis of said reference remaining capacity (V_N), said start voltage (V_F), a predetermined cutoff voltage (V_E) of said secondary battery (3), and said output voltage value (terminal voltage of the battery (3) V_N).

Accordingly, claims 17 & 29 are anticipated.

As per claims 18 & 25, Shimoyama discloses (col. 4, lines 26+) that the battery remaining capacity calculating method, wherein the remaining capacity in said high consumption mode (0% remaining capacity) is calculated by an equation $\frac{V_N^2 - V_E^2}{V_F^2 - V_E^2}$

where $Q_n = \frac{V_N + V_E}{V_F + V_E}$ and $V_m = V_N$; $V_t = V_E$; $V_n = V_F$ using the reference remaining capacity Q_n , the start voltage V_N , the cutoff voltage V_E , and the output voltage value (terminal voltage of the battery (3), (V_F)).

Accordingly, claims 18 & 25 are anticipated.

As per claim 19, Shimoyama discloses () that the battery remaining capacity calculating method, further comprising:

setting a voltage gap ($V_F^2 - V_E^2$) as an output voltage change at the time of the use mode change (from fully charged to 0% remaining capacity),

wherein a remaining capacity $\frac{V_N^2 - V_E^2}{V_F^2 - V_E^2}$ is calculated on a basis of said voltage gap and said output voltage value (V_N).

Accordingly, claim 19 is anticipated.

7. As per claims 21-22, Shimoyama discloses (col. 4, lines 1-59) and shows in Figs. 3-4 that the battery remaining capacity calculating method, wherein whether said secondary battery (3) is in said low consumption mode (Full battery charged corresponding to $V_N = V_F$) or in said high consumption mode (corresponding to 0%

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remaining capacity or corresponding to minimum voltage, $V_N = V_E$) is determined by measuring (via current sensor (7)) an output current value of secondary battery (3) or by detecting (via voltage sensor (9)) a change in output voltage (V_N) of said secondary battery (3).

Accordingly, claims 21-22 are anticipated.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. **Claims 20 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoyama et al., (Shimoyama).**

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11. As per claims 20 & 27, Shimoyama discloses (cols. 5 – 6; col. 7, lines 1 - 44) and shows in Figs. 5 - 6 a correction method for accurately calculating the remaining capacity of a battery by taking into account the temperature data (thus voltage variation, since the voltage of a battery is proportional to its temperature, see col. 3, lines 26-28) by adding or subtracting from the full-charged voltage or from the empty voltage depending on whether the battery is fully charged corresponding to $V_N = V_F$ or in said 0% remaining capacity, which corresponds to minimum voltage, $V_N = V_E$.

Shimoyama differs from the claimed invention because he does not specifically disclose the battery remaining capacity calculating method, wherein an addition voltage value ($V_m + \Delta V$) is calculated by adding said voltage gap ΔV (which corresponds to either the first, second, third or fourth predetermined correct value, see equations (2) to (7)) said output voltage value V_m , and a remaining capacity at said addition voltage value ($V_m + \Delta V$) on said reference voltage curve is set as the remaining capacity Q_m in the high consumption mode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the predetermined correct value which are temperature correcting coefficients for a voltage gap since there is a tendency that a battery voltage gets lower when its temperature gets lower, as per the teachings of Shimoyama.

Accordingly, claims 20 & 27 would have been obvious.

Response to Arguments

12. Applicant's arguments filed on 11/19/2007 have been fully considered but they are not persuasive.
13. Applicant argues that Shimoyama fails to disclose or suggest several elements of the independent claims 16,24,26, and 28.
14. Examiner respectfully disagrees and submits that Shimoyama discloses and suggests the independent claims 16,24,26, and 28 as discussed in the rejection above.
15. Applicant argues that Shimoyama does not disclose a voltage discrimination means, instead Shimoyama discloses a temperature discrimination means (27).
16. Examiner respectfully disagrees and submits that Shimoyama discloses a voltage discrimination means (9) as shown in Fig. 3. Moreover, in performing text search on the claims, there is no disclosure anywhere about voltage discrimination means, thus rendering the argument moot.
17. Applicant argues that the voltage readings are not used in determining a low or high temperature state.
18. Examiner respectfully disagrees and submits that Shimoyama discloses (col. 4, lines 11-29) that a detected value input circuit (12) which comprises, inter alia, a temperature signal of a battery (3) from a temperature sensor (5), a voltage sensor (9), a current sensor (7), a discharge current signal and a detected voltage signal of a battery (3) are inputted into the remaining capacity operation (19).
19. Applicant argues that the voltage data bypasses the temperature determination means (27) and the pattern calculation means 29,31.

20. Examiner respectfully disagrees and submits that the voltage data does not bypass the temperature determination means (27). Instead the input data from the detected value input circuit (12) is fed directly into the both the temperature discrimination means (27) and into the voltage estimate means (21).

21. As to Applicant's request to clarify as to how a fully charged battery voltage corresponds to a high (or low) consumption mode.

22. Examiner respectfully submits that a low consumption mode corresponds an open circuit or no load whereas a high consumption mode corresponds to a load connected to the battery and in such instance the battery discharges power to the load.

23. On the other hand when the battery is connected to a charger and when fully charged, that corresponds in turn to a high consumption mode (In this case the battery is a load to the charger).

Conclusion

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M'baye Diao whose telephone number is 571-272-9748. The examiner can normally be reached on 8:30-5:00; First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on 571-272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Adolf Berhane/
Adolf Berhane
Primary Examiner
Art Unit 2838

M.D